User's Manual

A Pentium 4 Processor based AGP (4X) mainboard (100MHz)

Supports PC1600/2100/PC2700 Memory Modules (DDR Memory)

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600024D11

Frequently Asked Questions For POST Port Only

The Below is the list of some basic POST Codes and their possible problems and solutions. For more detail information about POST Codes, please refer to Appendix E on this manual.

POST CODE	Problem	Solution
FFh or CFh	1.BIOS chip replace inverse 2.Update wrong BIOS 3.Mainboard problem 4.ADD-ON Card insert inappropriate	1.Make sure BIOS chip replace appropriate 2.Make sure all Hardware Device insert appropriate 3.Swap mainboard
C1h – C5h E1h – EEh A1h – A7h	1.Memory insert inappropriate 2.Memory compability problem 3.Memory Bad 4.SPD Data incorrect	1.Make sure insert Memory appropriate 2.Swap Memory
2Dh	1.Error occurs in VGA BIOS 2.VGA Card insert inappropriate	1.Swap VGA Card 2.Make sure insert VGA Card appropriate
26h	1.Over clock fail	1. Clear CMOS or press insert key to power on
07h – 12h	1.Init Keyboard Controller 2.RTC	1. Make sure insert K/B & Mouse appropriate 2.Swap Battery

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Section 1
INTRODUCTION

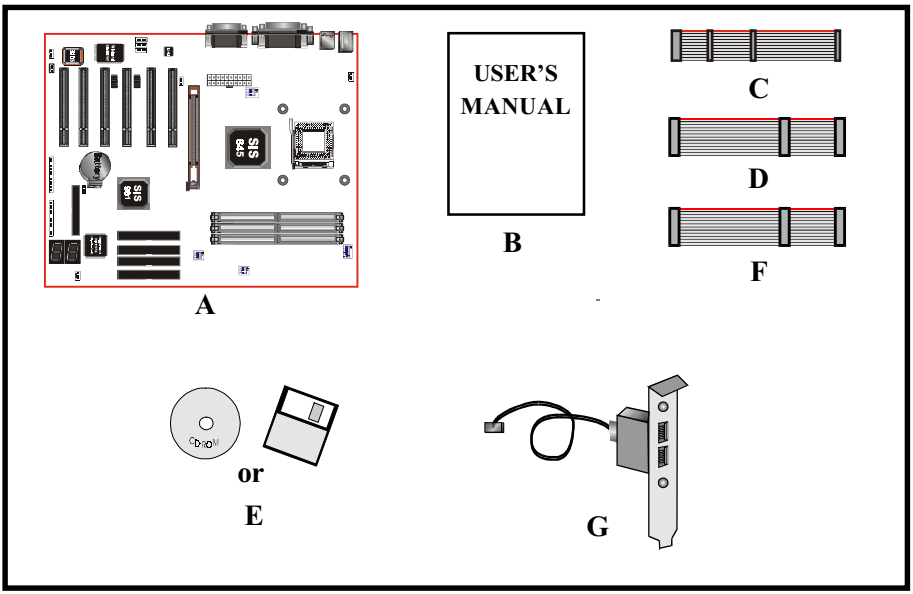
Components Checklist

Package Contents

- ☑ A. (1) Mainboard
- ☑ B. (1) User's manual
- ☑ C. (1) Floppy ribbon cable
- ☑ D. (1) ATA-66/100 Hard drive ribbon cable
- ☑ E. (1) Driver and utility

Optional Item

- ☐ F. (1) ATA-33 Hard drive ribbon cable
- ☐ G. (1) USB Cable



Intel Pentium 4 processors

Formally known as the Willamette, the Pentium™ 4 is the next generation IA-32 processor from Intel. This next generation design is based upon a new micro-architecture that brings higher clock speeds and performance than previous processors could deliver. Among other advanced features the Pentium 4 offers Streaming SIMD extensions 2, Advanced Dynamic Execution, Hyper Pipelined Technology, and a data transfer rate of 400MHz system bus.

Streaming SIMD Extensions 2
Building upon the foundations of core features of their previous line of processors the Pentium III, this new version introduces Streaming SIMD Extensions 2 technology commonly referred to as SSE2. But what does this mean? SIMD stands for Single Instruction Multiple Data. Usually, processors process one data element in one instruction, called Single Instruction Single Data, or SISD. In contrast, with Single Instruction Single Data (SISD), SIMD has the ability to process more than one piece of data element during one instruction.

This technology is useful for 3D graphics applications that handle considerable amounts of floating-point numbers. With SIMD applications such as 3D graphics will be able to processor more data per instruction when equates to better performance. This technology adds 144 new instructions to the CPU core that can be used in a wide variety of applications. Software programmers can for example, take advantage of these new instructions and write more optimized code that take advantage of newer SIMD double-precision floating-point, integer, and cache ability instructions. In theory this will enable better next generation services such as Interactive Digital TV to be produced.

Advanced Dynamic Execution
Advanced Dynamic Execution describes the improved implementation and abilities over the older P6 processor line's out-of-order decoupled super scalar execution. Dynamic execution allows instructions to the processor to be executed without the need to do so in order. The ability to do this can add a significant performance increase versus ordered execution.

Hyper Pipelined Technology & 400MHz System Bus
Hyper Pipelined Technology doubles the pipeline depth the Pentium 4 delivers to 20 stages. This significantly increases the performance and frequency capabilities. Pentium 4 also introduces a 400MHz system bus as opposed to the 100 and

133MHz bus seen in previous Pentium III processors. This allows 3.2Gbytes per second of throughput while the Pentium III had a limited 1.06Gbyte/s throughput. Willamette will reportedly be introduced in the 0.18-micron using aluminum.

For more information about all the cool new features the Pentium 4 delivers *check out the Intel website at http://www.intel.com*

Accelerated Graphics Port (AGP or A.G.P.)

Typically, 3D graphics rendering requires a tremendous amount of memory, and demands ever increasing throughput speed as well. As 3D products for the personal computer become more and more popular, these demands will only increase. This will cause a rise in costs for both end users and manufacturers. Lowering these costs as well as improving performance is the primary motivation behind AGP. By providing a massive increase in the bandwidth available between the video card and the processor, it will assist in relieving some of these pressures for quite sometime.

The board provides the AGP 2.0 interface. The AGP Interface Specification revision 2.0 enhances the functionality of the original AGP Interface Specification (revision 1.0) by allowing 4X data transfers (4 data samples per clock) and 1.5 volt (power supply) operation. The AGP 2.0 interface, along with SDRAM memory technology, allows graphics controllers to access main memory at over 1GB/s. In order to match the 2X and 4X AGP Card. The board used the Universal AGP connector.

Ultra ATA/66/100

The board provides two channel Ultra ATA/66/100 Bus Master IDE controllers, that support Ultra ATA/66/100 protocols, perfect for such demanding applications as real-time video, multimedia, and high performance operating system. A new IDE cable is required for Ultra ATA/66/100. This cable is an 80 conductor cable; however the connectors are, of course, backwards compatible with ATA/33.

Hardware Monitoring

Hardware monitoring allows you to monitor various aspects of your systems operations and status. The features include CPU temperature, voltage and RPM of fan.

Mainboard Form-Factor

The board is designed with ATX form factor - the latest industry standard of chassis. The ATX form factor is essentially a Baby-AT baseboard rotated 90 degrees within the chassis enclosure and a new mounting configuration for the power supply. With these changes the processor is relocated away from the expansion slots, allowing them all to hold full length add-in cards. ATX defines a double height aperture to the rear of the chassis which can be used to host a wide range of onboard I/O. Only the size and position of this aperture is defined, allowing PC manufacturers to add new I/O features (e.g.; TV input, TV output, joystick, modem, LAN, audio, etc.) to systems. This will help systems integrators differentiate their products in the marketplace, and better meet your needs.

- By integrating more I/O down onto the board and better positioning the hard drive and floppy connectors material cost of cables and add-in cards is reduced.
- By reducing the number of cables and components in the system, manufacturing time and inventory holding costs are reduced and reliability will increase.
- By using an optimized power supply, it's possible to reduce cooling costs and lower acoustical noise. An ATX power supply, which has a side-mounted fan, allows direct cooling of the processor and add-in cards making a secondary fan or active heatsink unnecessary in most system applications.

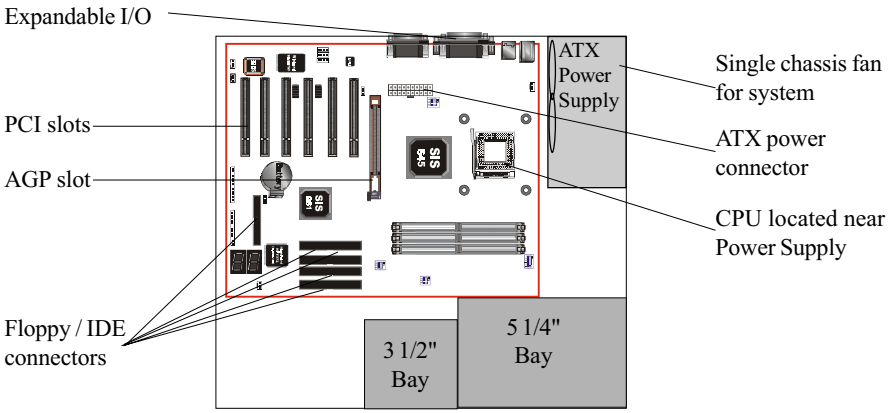


Figure 2: Summary of ATX chassis features

I/O Shield Connector

The board is equipped with an I/O back panel. Please use the appropriate I/O shield (figure 3).

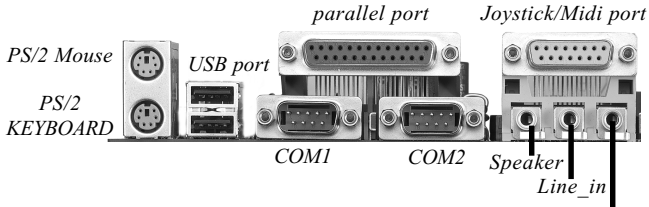


Figure 3: I/O back panel layout

Power-On/Off (Remote)

The board has a single 20-pin connector for ATX power supplies. For ATX power supplies that support the **Remote On/Off** feature, this should be connected to the systems front panel for system Power On/Off button. The systems power On/Off button should be a momentary button that is normally open.

The board has been designed with “Soft Off" functions. You can turn Off the system from one of two sources: The first is the front panel Power On/Off button, and the other is the "Soft Off" function (coming from the BOARD’s onboard circuit controller) that can be controlled by the operating system such as Windows® 95/98 and Windows® 2000 to Shutdown the system.

Note: For maintaining the DDR SDRAM power during STR (ACPI S3) function, it is strongly recommend to use ATX power supplies that have a +5VSB current of (>=) 1A (1000mA). Please check the 5VSB’s specification that has been printed on the ATX power supply’s outer case.

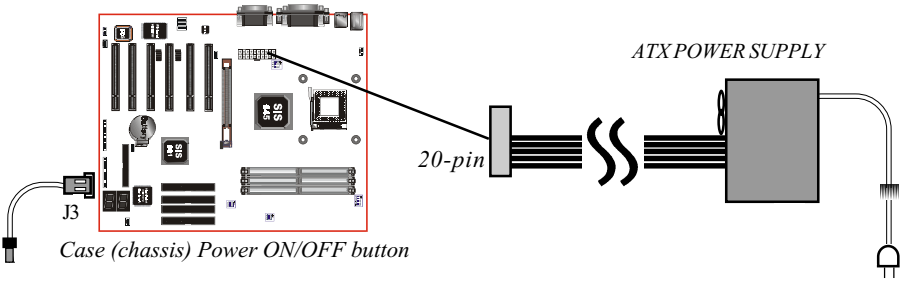


Figure 4: Simple ATX Power ON/OFF Controller

System Block Diagram

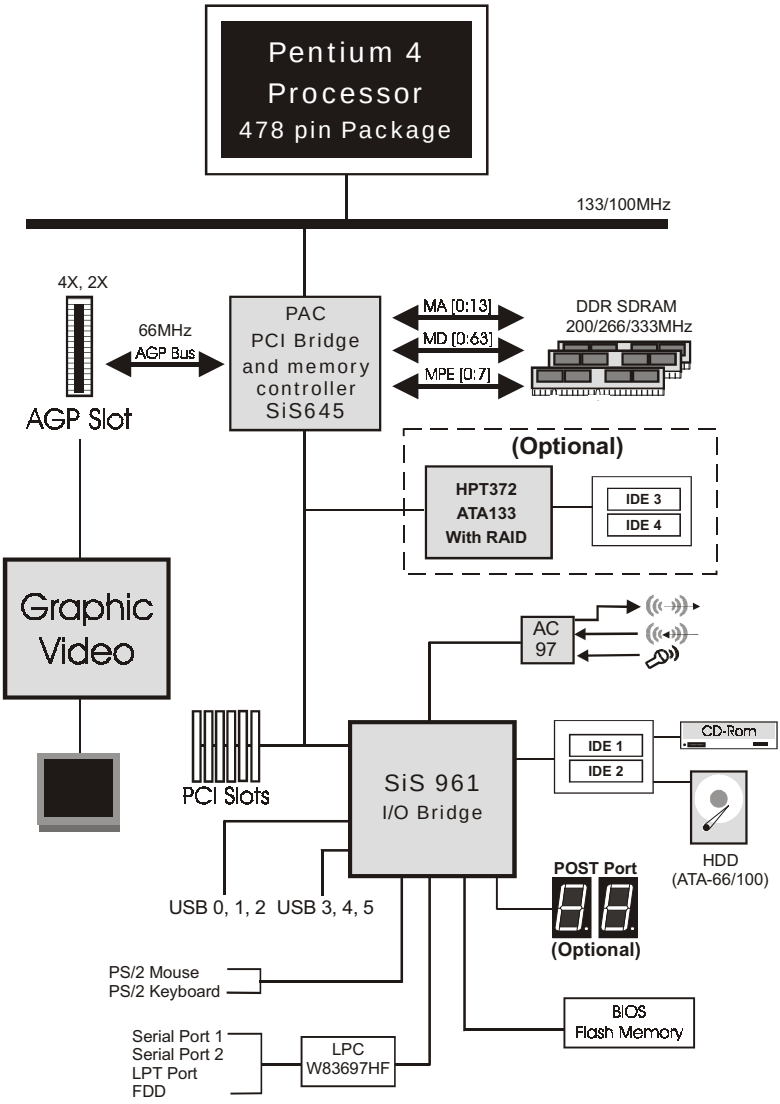


Figure 5: System Block Diagram

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Section 2
FEATURES

Mainboard Features:

- **PROCESSOR**
  - Intel® Pentium 4 Processor with FC-PGA2 socket 478 package: Operating at 1.5 ~ 2.2GHz
- **CHIPSET**
  - SiS 645 AGPset (SiS 645 + SiS 961)
- **Front Side Bus**
  - 100MHz (a data transfer rate of 400MHz)
- **DRAM MODULE**
  - 184pin DDR DIMM x 3 for PC1600/2100/2700 Memory
  - DRAM Size: 64MB to 3GB
- **EXPANSION SLOT**
  - PCI x 6, 4X AGP x 1
- **ONBOARD I/O**
  - Winbond W83697HF LPC I/O integrated with K/B , Mouse, FDD, Parallel and Serial, Fast IR and Power-ON controllers
- **ONBOARD PCI / IDE**

  SiS 961 Controller
  - PCI Rev. 2.2 Compliant
  - ACPI Compliant Power Management
  - AC97 2.2 Compliant Link for Audio CODEC
  - LPC Interface 1.0 Compliance

- PCI Bus IDE Port with PIO /**Ultra DMA-66/100** x 2 (Up to 4 Devices)
- Extra IDE Port by HPT372 with **Ultra DMA-66/100/133** and IDE RAID x 2 (Up to 4 Devices) **(Optional)**

◆ **I/O CONNECTOR**

- PS/2 Mouse and PS/2 style Keyboard
- COM1, COM2, Printer, Audio-in/out, MIC & Game port connector

◆ **USB**

- USB connector x 6 (4 for Opt.)

◆ **Built-in AC97 Digital Audio**

- Dual full-duplex Direct Sound channels
- FM synthesis for legacy compatibility
- Supports Game and MIDI port

◆ **BIOS**

- Award Plug & Play BIOS

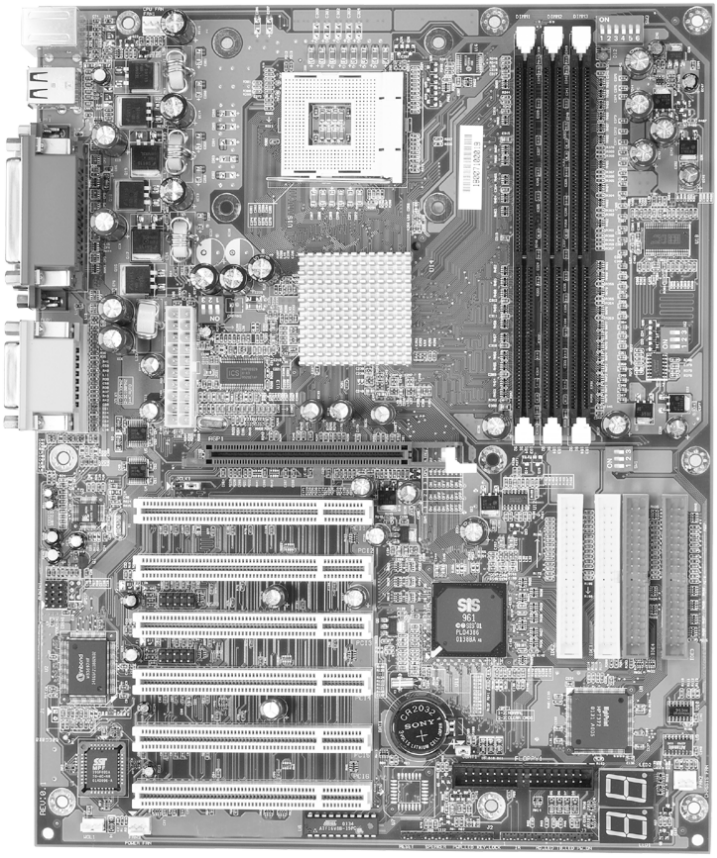
◆ **EXTENDED FUNCTION**

- Supports Hardware Monitoring Function by W83697HF
- Supports exclusive KBPO (Keyboard Power ON) Function
- Supports STR (Suspend To RAM) power saving Function
- Supports Wake-On-LAN Function
- Supports CPU Vcore Voltage Settings via Switch and BIOS
- Supports CPU Ratio and Clock Settings via BIOS
- Supports AGP Vcore Voltage Settings via Switch and BIOS
- Supports Memory Vcore Voltage Settings via Switch and BIOS
- Supports Magic Health and Easy Boot Function
- POST Port onboard design with 7-segment LED display (Optional)

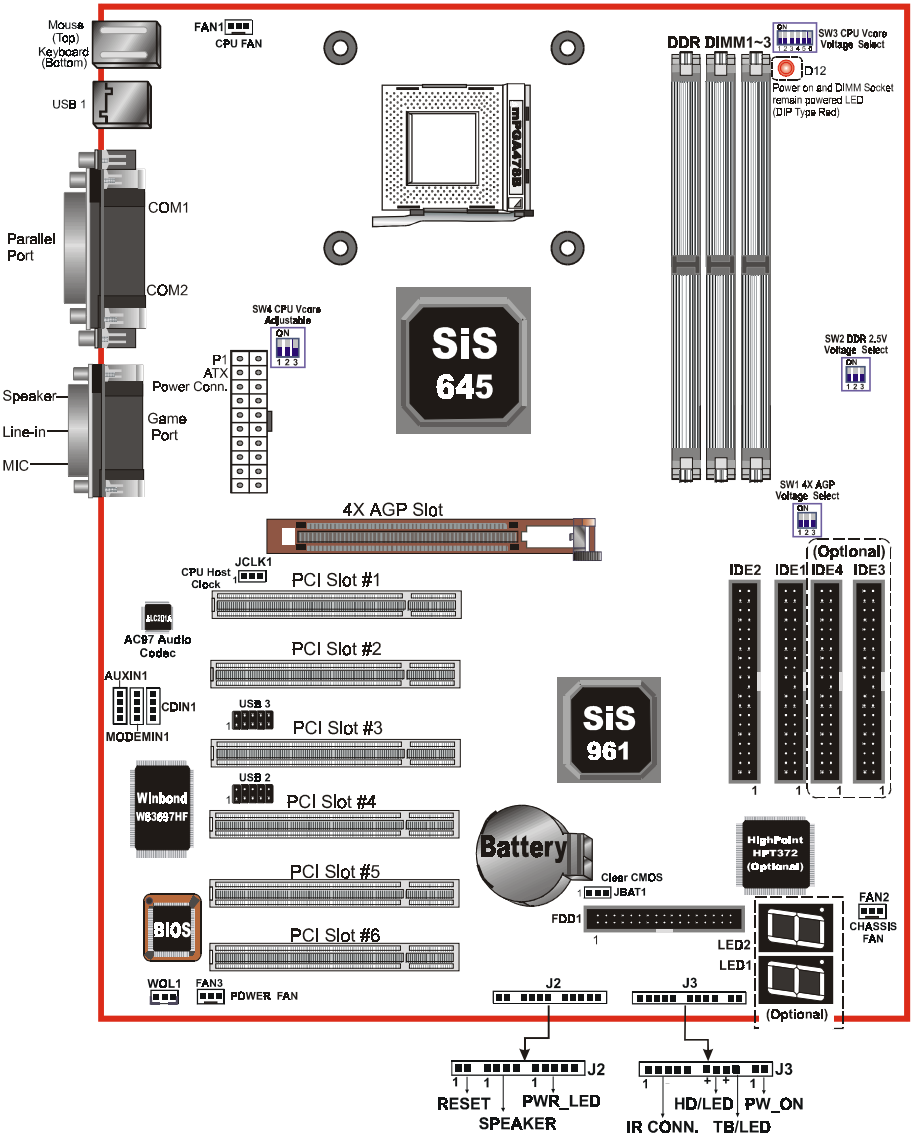
◆ **FORM FACTOR**

- 305mm x 245mm ATX Size

Section 3
INSTALLATION



Mainboard Detailed Layout



Easy Installation Procedure

The following must be completed before powering on your new system:

3-1. CPU Installation

3-2. Jumper Settings

3-3. System Memory Configuration

3-4. Device Connectors

3-5. STR Function

Section 3-1
CPU Installation

CPU Installation:

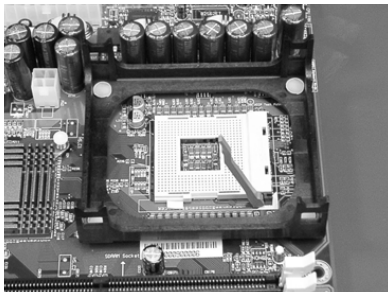


Figure 1

Step 1

Open the socket by raising the actuation lever.

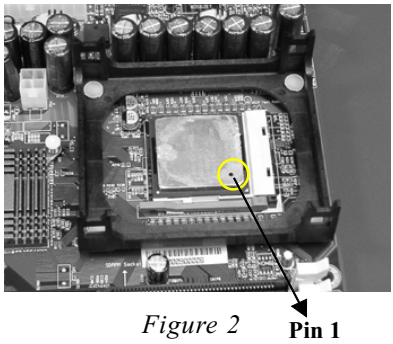


Figure 2

Step 2

Insert the processor.

Ensure proper pin 1 orientation by aligning the FC-PGA2 corner marking with the socket corner closest to the actuation arm tip. The pin field is keyed to prevent mis-oriented insertion. Don't force processor into socket. If it does not go in easily, check for mis-orientation and debris. Make sure the processor is fully inserted into the socket on all sides.

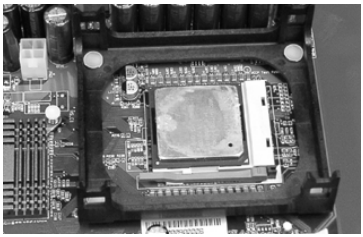


Figure 3

Step 3

Close the socket by lowering and locking the actuation lever.

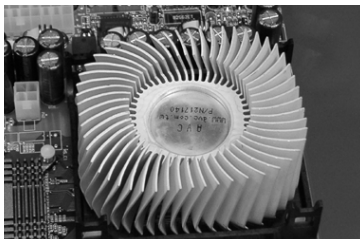


Figure 4

Step 4

Install the Fan Heatsink.

* Please do apply thermal compound between CPU and Heatsink.

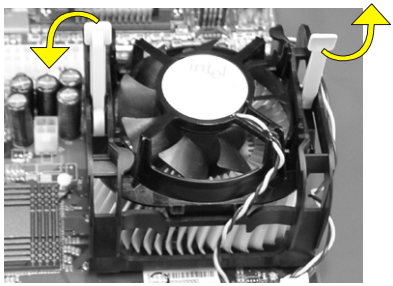


Figure 5

Step 5

Install the Shround Assembly and follow the arrow of Figure 5 for press the two Clip Assembly.

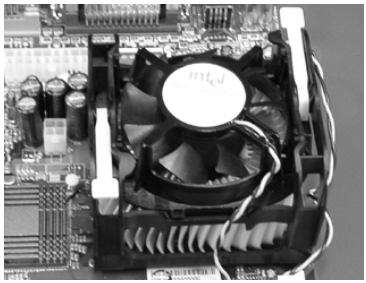


Figure 6

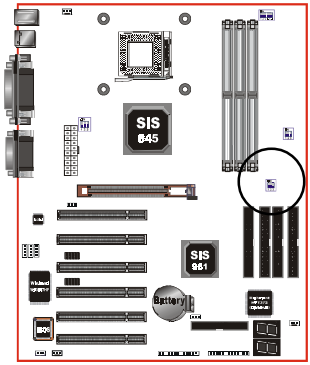
Step 6

Make sure the CPU fan is plugged to the CPU fan connector. The installation is completed.

NOTE:

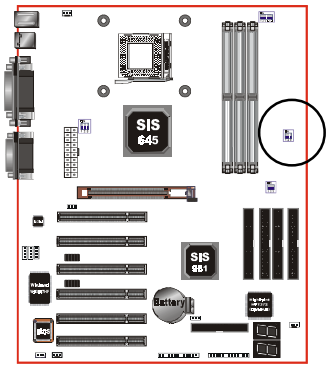
1. Intel Pentium™ 4 processor might be crashed if installed with a regular CPU Fan since it is equipped with all new micro- architecture that brings quite small size of CPU(Die). We recommend using Intel's reference design thermal solution which is an active heatsink; an extruded aluminum heatsink based and a fan attached to the top on the fin array.
   Additionally, please do apply heatsink thermal compound or paste and install CPU fan to avoid CPU overheated and damaged.
2. According to the guidance of Intel Corp, please do not install the same CPU over 50 times as it will bend the pins and damage the CPU.

Section 3-2
Jumper Settings



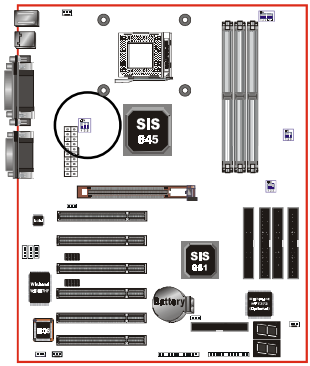
SW1: 4X AGP Voltage Selection

SW1			4X AGP (V)
1	2	3	
ON	ON	ON	2.2
ON	ON	OFF	2.1
ON	OFF	ON	2.0
ON	OFF	OFF	1.9
OFF	ON	ON	1.8
OFF	ON	OFF	1.7
OFF	OFF	ON	1.6
OFF	OFF	OFF	1.5 **(Default)**



SW2: DDR 2.5V Selection

SW2			VCC25
1	2	3	
ON	ON	ON	3.2
ON	ON	OFF	3.1
ON	OFF	ON	3.0
ON	OFF	OFF	2.9
OFF	ON	ON	2.8
OFF	ON	OFF	2.7
OFF	OFF	ON	2.6
OFF	OFF	OFF	2.5 **(Default)**

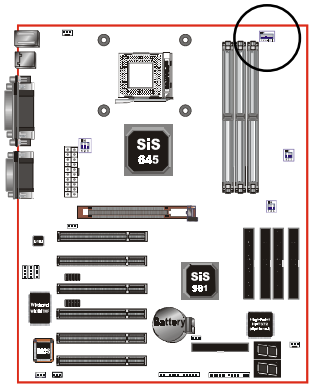


SW4: CPU Vcore Voltage Adjustable

SW4			Vcore (V)
1	2	3	
ON	ON	ON	+0.175
ON	ON	OFF	+0.150
ON	OFF	ON	+0.125
ON	OFF	OFF	+0.100
OFF	ON	ON	+0.075
OFF	ON	OFF	+0.050
OFF	OFF	ON	+0.025
OFF	OFF	OFF	+0.000 **(Default)**

Note: 1. Switch SW4 is designed for over-range increment and for porfessional users. Please setup with care.

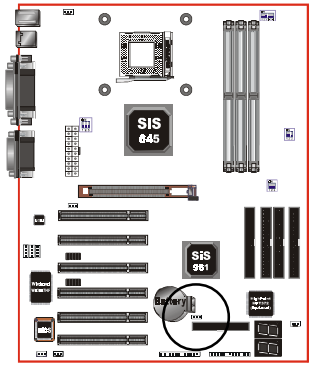
2. Operating Vcore voltage
   = BIOS setting + SW4 setting (when SW3 is at AUTO)
   = SW3 setting + SW4 setting (when BIOS setting is Default)



SW3: CPU Vcore Voltage Selection

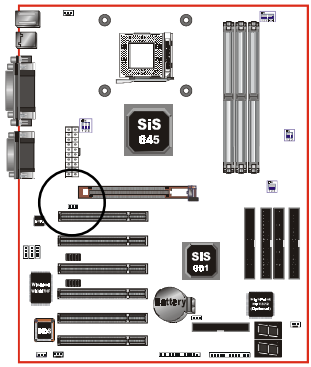
	SW3						CPU Vcore (V)
	1	2	3	4	5	6	
	OFF	OFF	OFF	OFF	ON	ON	1.475
	ON	OFF	OFF	OFF	ON	ON	1.500
	OFF	ON	OFF	OFF	ON	ON	1.525
	ON	ON	OFF	OFF	ON	ON	1.550
	OFF	OFF	ON	OFF	ON	ON	1.575
	ON	OFF	ON	OFF	ON	ON	1.600
	OFF	ON	ON	OFF	ON	ON	1.625
	ON	ON	ON	OFF	ON	ON	1.650
	OFF	OFF	OFF	ON	ON	ON	1.675
	ON	OFF	OFF	ON	ON	ON	1.700
	OFF	ON	OFF	ON	ON	ON	1.725
	ON	ON	OFF	ON	ON	ON	1.750
	OFF	OFF	ON	ON	ON	ON	1.775
	ON	OFF	ON	ON	ON	ON	1.800
	OFF	ON	ON	ON	ON	ON	1.825
	ON	ON	ON	ON	ON	ON	1.850
(Default)	OFF	OFF	OFF	OFF	OFF	OFF	AUTO

*Note: any Vcore setting over CPU specification may cause CPU to be burned.



JBAT1

CMOS Clear
1-2: Normal (Default)
2-3: Clear CMOS



JCLK1

CPU Host Clock Select
1-2: 133MHz
2-3: 100MHz
3-4: AUTO (Default)

Section 3-3
System Memory Configuration

Memory Layout

The board supports (3) PC1600/2100/2700 184-pin DIMMs (Dual In-line Memory Module). The DIMMs is for DDR SDRAM (Double-Data-Rate Synchronous DRAM) only.

- Supports 64Mbit, 128Mbit, 256Mbit and 512Mbit technology.
- Supports up to 2 un-buffer DIMM DDR333 or up to 3 un-buffer Double-sided DIMM DDR266/200.
- Up to 1GB per DIMM with max. memory size up to 3GB.

Figure 7 and Table 1 show several possible memory configurations.

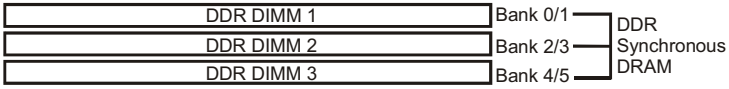


Figure 7

Total Memory	DDR DIMM 1 (Bank 0/1)	DDR DIMM 2 (Bank 2/3)	DDR DIMM 3 (Bank 4/5)
= 1GB Maximum	DDR SDRAM* 64MB, 128MB, 256MB, 512MB, 1GB* X 1	None	None
= 2GB Maximum	DDR SDRAM* 64MB, 128MB, 256MB, 512MB, 1GB* X 1	DDR SDRAM* 64MB, 128MB, 256MB, 512MB, 1GB* X 1	None
= 3GB Maximum	DDR SDRAM* 64MB, 128MB, 256MB, 512MB, 1GB* X 1	DDR SDRAM* 64MB, 128MB, 256MB, 512MB, 1GB* X 1	DDR SDRAM* 64MB, 128MB, 256MB, 512MB, 1GB* X 1

Table 1

** DDR SDRAM supports 64, 128, 256, 512MB and 1GB DIMM modules.*

** 1GB module using 512Mb technology.*

**** This mainboard doesn't support ECC memory module.***

DIMM Module Installation

Figure 8 displays the notch marks and what they should look like on your DDR DIMM memory module.

DIMMs have 184-pins and one notch that will match with the onboard DDR DIMM socket. DIMM modules are installed by placing the chip firmly into the socket at a 90 degree angle and pressing straight down (figure 9) until it fits tightly into the DIMM socket (figure 10).

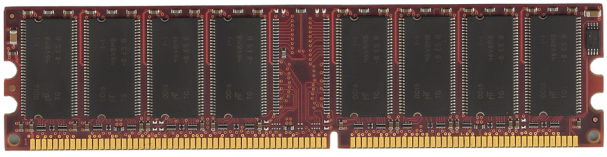


Figure 8

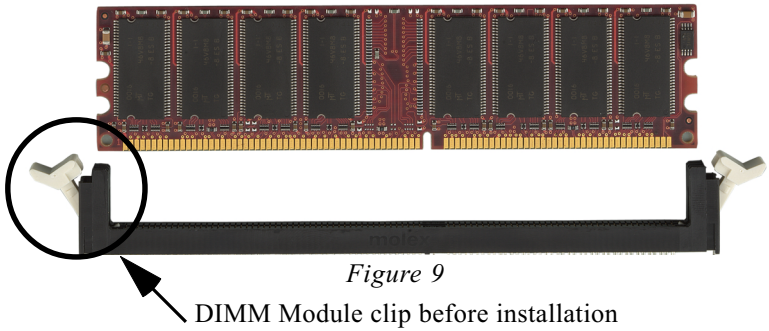


Figure 9

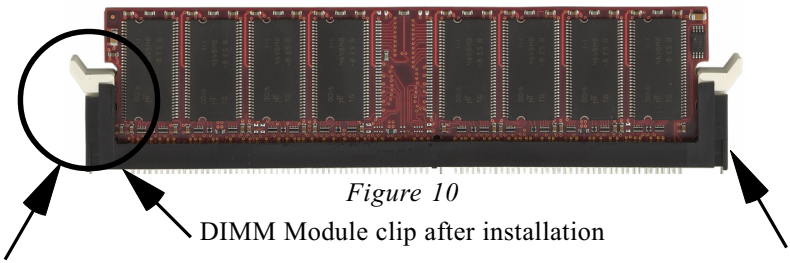


Figure 10

To remove the DIMM module simply press down both of the white clips on either side and the module will be released from the socket.

Section 3-4
Device Connectors

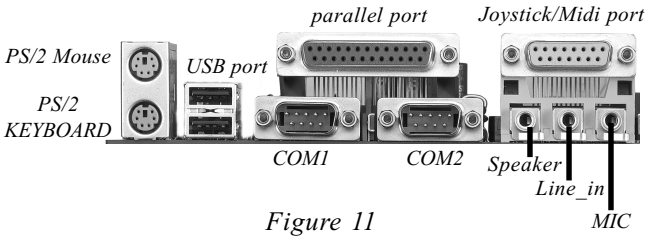
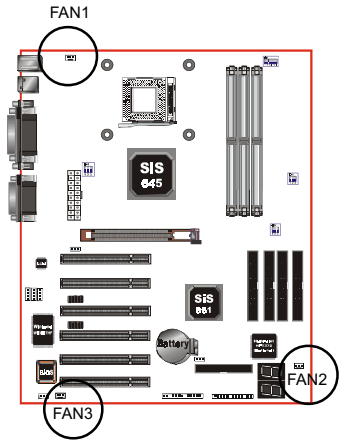


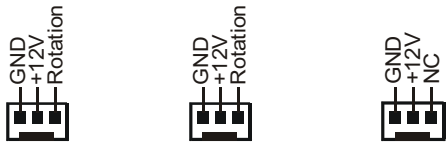
Figure 11

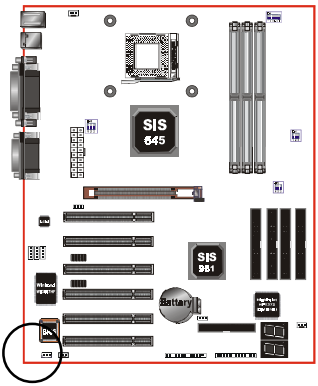


FAN1 / FAN2 / FAN3:

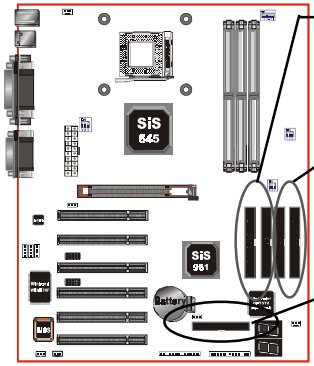
• The plug-in for CPU/Chassis/Power Fan power

FAN1:	FAN2:	FAN3:
CPU Fan	Chassis Fan	Power Fan





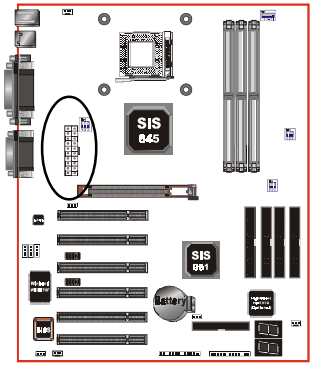
WOL1: WOL (Wake On LAN) Connector Reserved for NIC (Network Interface Card) to wake the system.



IDE1/2: Ultra DMA-66/100 Primary/Secondary IDE Connector (Yellow color)

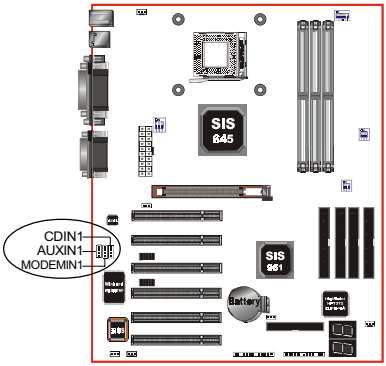
IDE3/4: Ultra DMA-66/100/133&RAID Primary/ Secondary Red IDE Connector (Supported by HTP372 chipset)**(Optional)**

FDD1: Floppy Controller Connector (Black color)

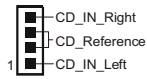


P1: ATX Power Connector

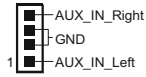
- 20-pin power connector



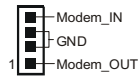
CDIN1: CD Audio_IN Connector

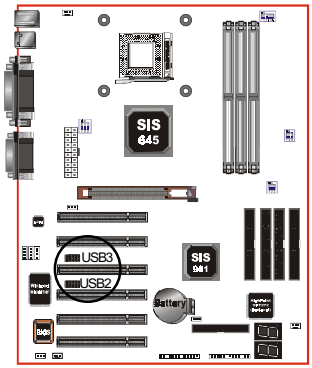


AUXIN1:Auxiliary Line_IN Connector

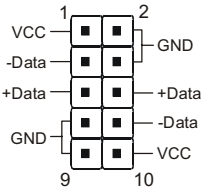


MODEMIN1: Telephony Connector for Modem audio output



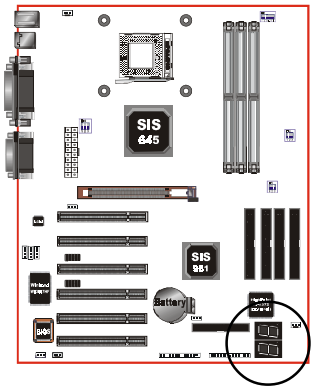


USB2/3: USB port header pins for share with four USB ports.



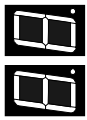
USB port header pin descriptions.

PIN#	Wire color	Signal Name	Comment
1	Red	Vcc	Cable Power
2	Black	Ground	Case Ground
3	White	-Data	Data
4	Black	Ground	Cable Ground
5	Green	+Data	Data
6	Green	+Data	Data
7	Black	Ground	Cable Ground
8	White	-Data	Data
9	Black	Ground	Case Ground
10	Red	Vcc	Cable Power

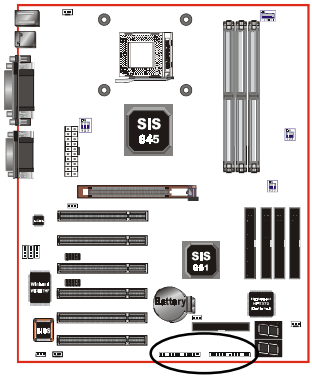


LED2

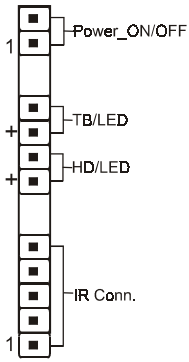
LED1



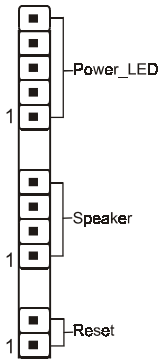
POST Debug 7-segment LED display on board. **(Optional)** (Please refer to Appendix E for POST codes)



J3



J2



- **Power On/Off**
  (This is connected to the power button on the case. Using the Soft-Off by Pwr-BTTN feature, you can choose either Instant Off (turns system off immediately), or 4 sec delay (you need to push the button down for 4 seconds before the system turns off). When the system is in 4 sec delay mode, suspend mode is enabled by pushing the button momentarily.)

- **Turbo LED indicator**
  LED ON when higher speed is selected

- **IDE LED indicator**
  LED ON when Onboard PCI IDE Hard disks is activate

- **IR Connector**
  1. VCC 4. GND
  2. NC 5. IRTX
  3. IRRX

- **Power LED**
  Power LED connector
  1. Power LED(+) 4. NC
  2. N/C 5. GND
  3. GND

- **Speaker**
  Connect to the system's speaker for beeping
  1. Speaker 3. GND
  2. N/C 4. GND

- **Reset**
  Closed to restart system.

3-5 STR (Suspend To RAM) Function

The board supports the STR power management state by maintaining the appropriate states on the DDR SDRAM interface signals. The power source must be kept alive to the DDR SDRAM during STR (ACPI S3). Advanced Configuration Power Interface (ACPI) provides more Energy Saving Features for operating systems that supporting Instant ON and QuickStart™ function.

1. To enable the ACPI function and use the STR functionally to save your system energy, you are recommended to confirm the following requirements:

   a. Please do install all ACPI qualified add-on cards such as AGP, LAN, Modem cards.

   b. In BIOS, please select "ACPI function: Enable" and "ACPI Suspend Type: S3(STR)" in the Power Management Setup menu.

   c. Then, please install the Windows® 98SE/ME or Windows® 2000.

   d. Restart your system.

   e. Getting in to the "Advanced" of the Power Management icon of Control Panel, and selecting the "Stand By" in the Power Buttons.

2. Getting start with STR function, please click the START button and choose Shut Down. Then, select the Stand By option in the Shut Down Windows box to get into STR mode.

   Here are the differences between STR power saving mode and Green (or Suspend) mode:

   a. It is the most advanced Power Management mode

   b. It cuts all the power supplied to peripherals except to Memory - max. power saving

   c. It saves and keeps all on-screen data including any executed applications to DDR SDRAM.

d. You must push the Power button connected with onboard J3 pin to wake up your system (not to click to PS/2 mouse or press PS/2 keyboard to wake up the system).

Just pushing Power button, your system will quickly back to the last screen for you.

The “LED Indicator for ACPI Status” table shown below will guide you and give you a reference for ACPI status on this mainboard.

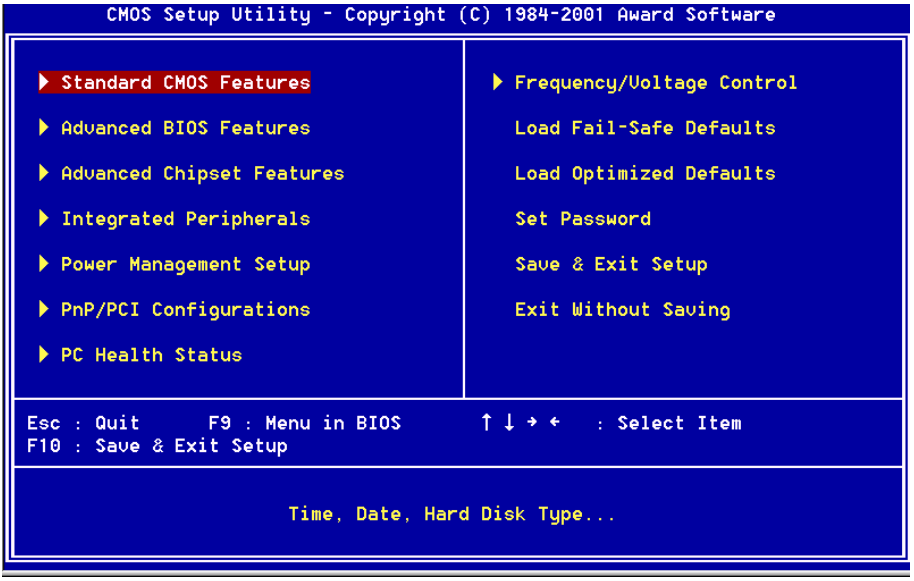
ACPI Onboard’s LED Status Indicator Table

Onboard’s LED Location	Status				
	Plug in the ATX Power Core	Power ON J3(PW-ON)	Green Mode (S1)	STR (S3)	Shutdown (Soft-OFF) (S5)
D12 (Red LED)	OFF	ON	ON	ON	OFF
J2 PW_LED	OFF	ON	Blinking	Slow Blinking	OFF

Section 4
BIOS SETUP

Main Menu

Once you enter the AwardBIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.



Note that a brief description of each highlighted selection appears at the bottom of the screen.

Setup Items

The main menu includes the following main setup categories. Recall that some systems may not include all entries.

Standard CMOS Features

Use this menu for basic system configuration.

Advanced BIOS Features

Use this menu to set the Advanced Features available on your system.

Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system's performance.

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals.

Power Management Setup

Use this menu to specify your settings for power management.

PnP / PCI Configuration

This entry appears if your system supports PnP / PCI.

PC Health Status

This item is only show the system health status (include Voltage, Fan speed, CPU temperature...)

Frequency/Voltage Control

Use this menu to specify your settings for frequency/voltage control.

Load Fail-Safe Defaults

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

Load Optimized Defaults

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

Set Password

Use this menu to set Passwords.

Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

Exit Without Saving

Abandon all CMOS value changes and exit setup.

4-1 Standard CMOS Setup

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

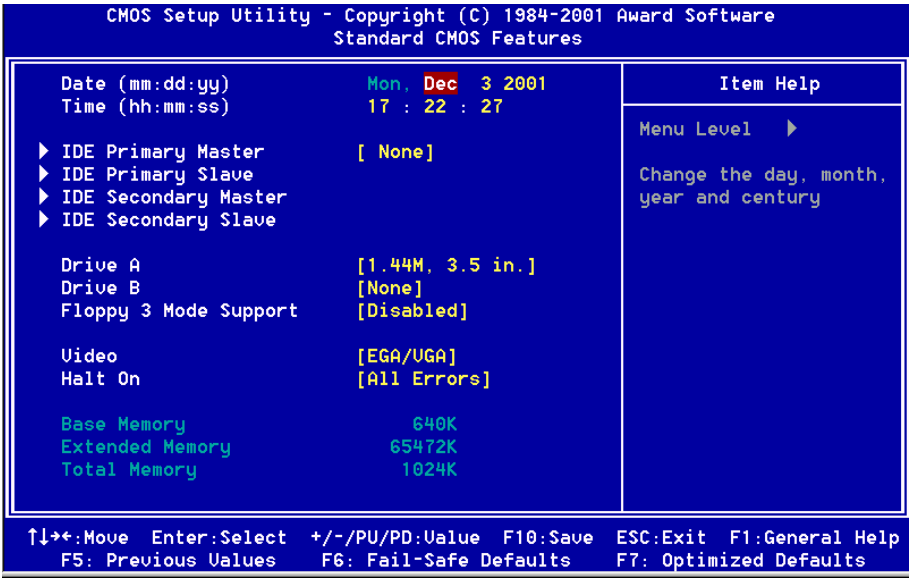
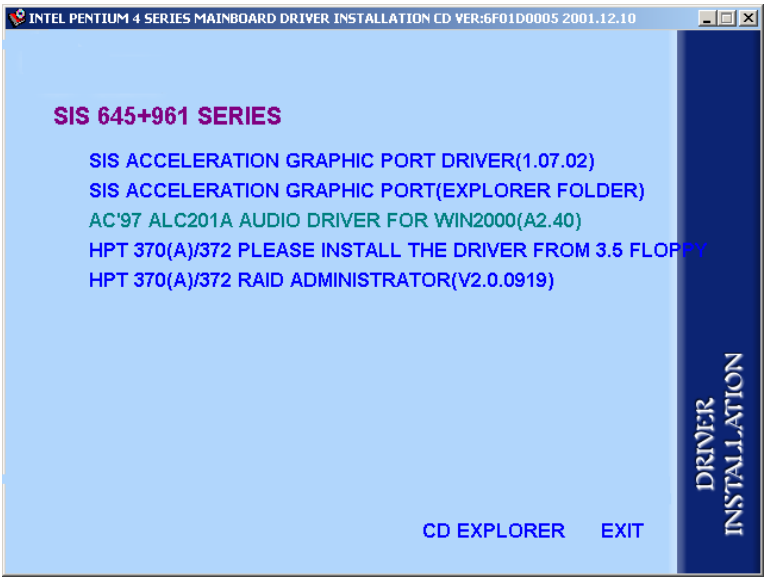

CMOS Setup Utility - Copyright (C) 1984-2001 Award Software
Standard CMOS Features
Date (mm:dd:yy) Mon, Dec 3 2001
Time (hh:mm:ss) 17 : 22 : 27
IDE Primary Master [None]
IDE Primary Slave
IDE Secondary Master
IDE Secondary Slave
Drive A [1.44M, 3.5 in.]
Drive B [None]
Floppy 3 Mode Support [Disabled]
Video [EGA/VGA]
Halt On [All Errors]
Base Memory 640K
Extended Memory 65472K
Total Memory 1024K
Item Help
Menu Level
Change the day, month, year and century
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

Figure 1: The Main Menu

Section 5
Driver Installation

Easy Driver Installation


INTEL PENTIUM 4 SERIES MAINBOARD DRIVER INSTALLATION CD VER:6F01D0005 2001.12.10
SIS 645+961 SERIES
SIS ACCELERATION GRAPHIC PORT DRIVER(1.07.02)
SIS ACCELERATION GRAPHIC PORT(EXPLORER FOLDER)
AC'97 ALC201A AUDIO DRIVER FOR WIN2000(A2.40)
HPT 370(A)/372 PLEASE INSTALL THE DRIVER FROM 3.5 FLOPPY
HPT 370(A)/372 RAID ADMINISTRATOR(V2.0.0919)
CD EXPLORER
EXIT
DRIVER INSTALLATION

Insert the bundled autorun driver CD-disk.

Step 1 : Click the **"SIS ACCELERATION GRAPHIC PORT DRIVER"** to install all components recommended.

Step 2 : Click the **"AC'97 ALC201A AUDIO DRIVER"** to install audio.

Note : If you install the HPT370(A)/372 Driver, please install the driver from 3.5 floppy. (For Optional)

The **"HPT370(A)/372 RAID ADMINISTRATOR"** item is for install Raid Administrator. (For Optional)

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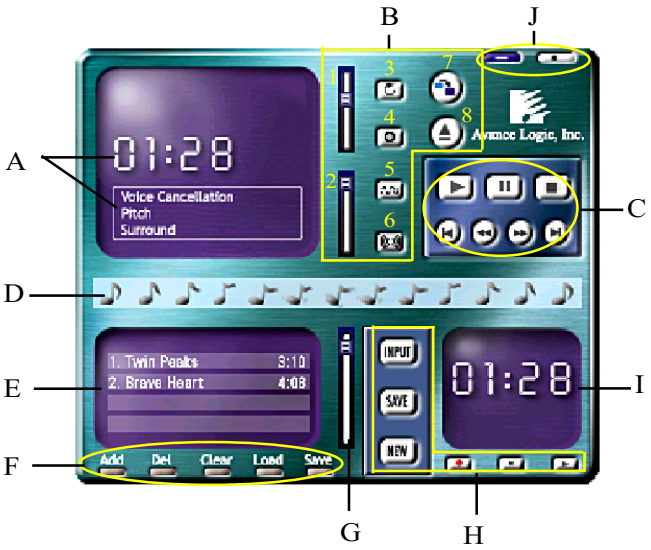
Appendix A

A-1 Avance® Media Player User's Guide

Avance® Media Player Platform



Functional Descriptions

A. Playback Windows Display

Playback windows displays the following mode information:

1. Playback Time Display
2. Voice Cancellation Mode Display
3. Pitch Mode Display
4. Surround Sound Mode Display

B. Playback Function Controls

There are 8 selectable functions for the playback:

1. Volume control — High/Low Adjustment Bar.
2. Pitch control — 4-step High/Low Adjustment Bar.

3. Repeat mode — Choice of Repeat, All Repeat, Random or No Repeat Mode.

4. Mute — Mute On/Off Mode select.

5. Voice cancellation — Voice Cancellation On/Off Mode select for Karaoke.

6. Surround mode — A total of 26 Surround Sound mode select as shown in the table below.

Surround mode	Surround mode
Generic	Stone corridor
Padded	Alley
Room	Forrest
Bathroom	City
Living room	Mountain
Stone	Quarry
Auditorium	Plain
Concert	Parking lot
Cave	Sewer pipe
Arena	Under water
Hangar	Drug
Carpet	Dizzy
Hallway	Psychological

7. Skin change — Media Player Skin Type select.

8. Open — Open file formats including MP3, CDA, MDI, WAV & WMA support.

C. Playback Controls

The playback controls include “Play”, “Pause”, “Stop”, “Previous”, “Backward”, “Forward”, & “Next”.

D. Seeking bar

Display Animated Playback Status

E. Title/Play List Windows

Display Currently Selected Title(s)

F. Title/Play List Edit Controls

There title/play list controls include “Add”, “Del”, “Clear”, “Load”, & “Store”.

1. Add	Add to the Title/Play List.
2. Del	Remove form the Title/Play List.
3. Clear	Clear the Title/Play Lost.
4. Load	Load Title/Play List.
5. Store	Save Title/Play List.

G. Title/Play List Scroll bar

Scroll Up/Down the Title/Play List.

H. Recording Function Controls

The recording function controls include “Input”, “Save:, “New”, “Rec”, “Stop”, & “Play”.

1. Input	Input soruce select.
2. Save	Save to file.
3. New	Open new file & select format includes Sampling Rate, Sampling bit, Mono or Stereo.
4. Rec	Start Rec.
5. Stop	Stop Rec.
6. Play	Playback Rec file.

I. REC/Playback Time Display

Displays REC/Playback Time.

J. Platform Display Panel Controls

The platform display panel control include “Minimize” & “Close”.

1. Minimize	Minimize Platform Display Panel.
2. Close	Close/Exit Platform Display Panel.

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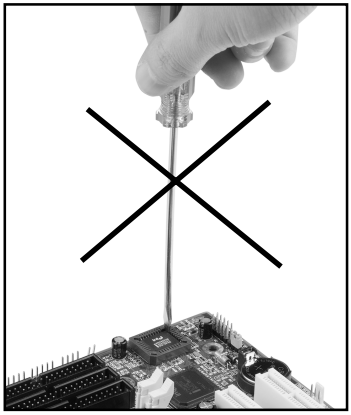
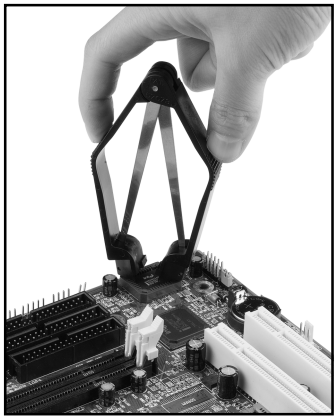
Appendix B

B-1 EEPROM BIOS Remover

Do not remove the BIOS chip, unless instructed by a technician and only with a PLCC IC extractor tool.





The BIOS socket may be damaged if using an improper method to replace the BIOS chip.

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Appendix C

C-1 Update Your system BIOS

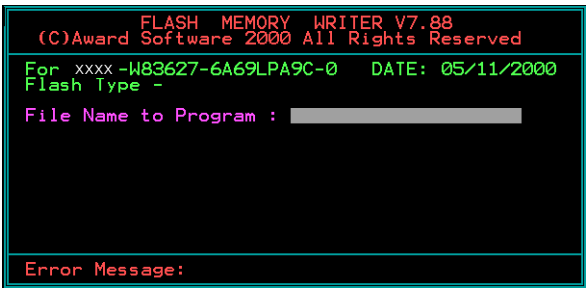
Download the xxxxx.EXE file corresponding to your model form the our website to an empty directory on your hard disk or floppy. Run the downloaded xxxxx.EXE file and it will self extract. Copy these extracted files to a bootable DOS floppy disk.

Note: The DOS floppy disk should contain NO device drivers or other programs.

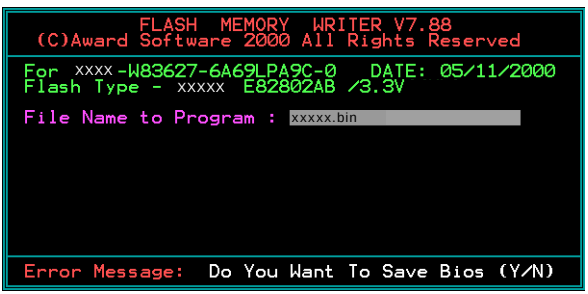
1. Type "A:\AWDFLASH and press <Enter> Key.

2. You will see the following setup on screen.

3. Please key in the xxxxx.bin BIOS file name.


FLASH MEMORY WRITER V7.88
(C)Award Software 2000 All Rights Reserved
For xxxx-W83627-6A69LPA9C-0 DATE: 05/11/2000
Flash Type -
File Name to Program :
Error Message:

4. If you want to save the previous BIOS data to the diskette, please key in [Y], otherwise please key in [N].


FLASH MEMORY WRITER V7.88
(C)Award Software 2000 All Rights Reserved
For xxxx-W83627-6A69LPA9C-0 DATE: 05/11/2000
Flash Type - xxxxx E82802AB /3.3V
File Name to Program : xxxxx.bin
Error Message: Do You Want To Save Bios (Y/N)

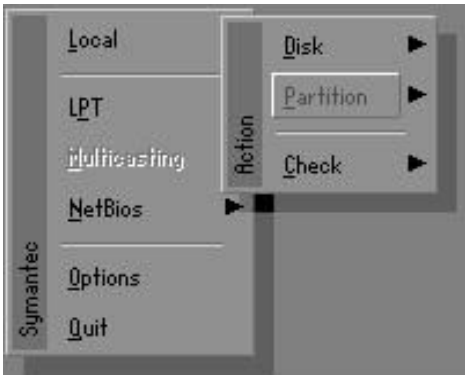
Appendix D

D-1 GHOST 5.1/6.03 Quick User's Guide (Optional)

Installation is very easy. You only need to copy the **Ghost5** folder or **Ghost.exe** to your hard disk.
The current market version is for single **Client**, so the LPT and NetBios portions will not be explained further.

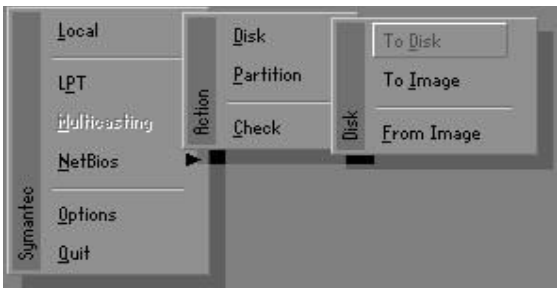
Description of Menus

Ghost clones and backs up **Disk** and **Partition.**



In which **Disk** indicates hard disk options
Partition indicates partition options
Check indicates check options

Disk



There are 3 hard disk functions:

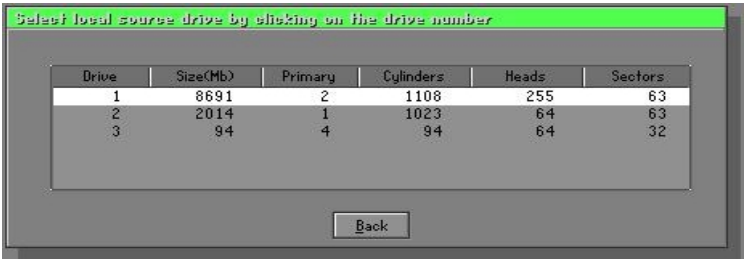
1. Disk To Disk (disk cloning)
2. Disk To Image (disk backup)
3. Disk From Image (restore backup)

Important!

1. To use this function, the system must have at least 2 disks. Press the **Tab** key to move the cursor.
2. When restoring to a destination disk, all data in that disk will be completely destroyed**.**

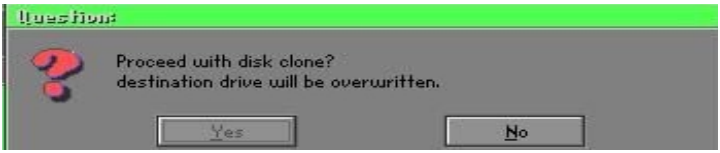
Disk To Disk (Disk Cloning)

1. Select the location of the **Source drive**.
2. Select the location of the **Destination drive**.



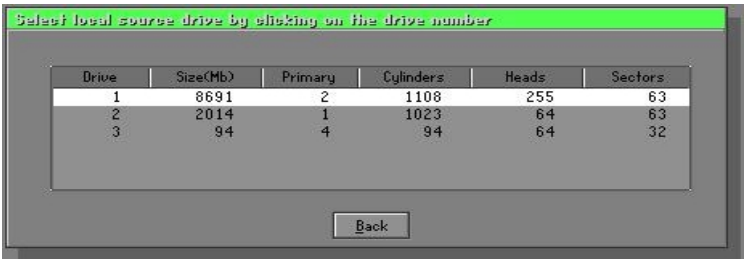
3. When cloning a disk or restoring the backup, set the required partition size as shown in the following figure.

4. Click OK to display the following confirmation screen. Select **Yes** to start.

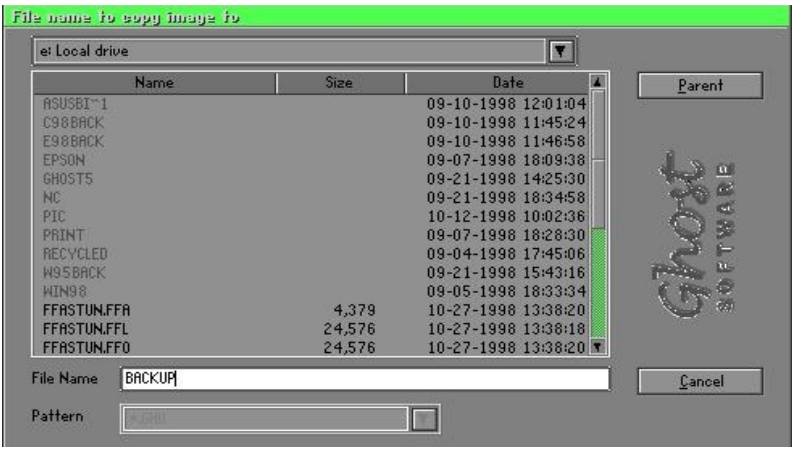


Disk To Image (Disk Backup)

1. Select the location of the Source drive.


Select local source drive by clicking on the drive number
Drive Size(Mb) Primary Cylinders Heads Sectors
1 8691 2 1108 255 63
2 2014 1 1023 64 63
3 94 4 94 64 32
Back

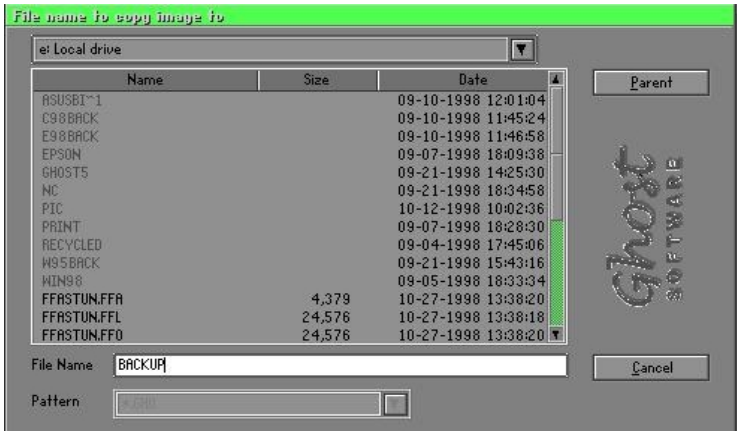
2. Select the location for storing the backup file.



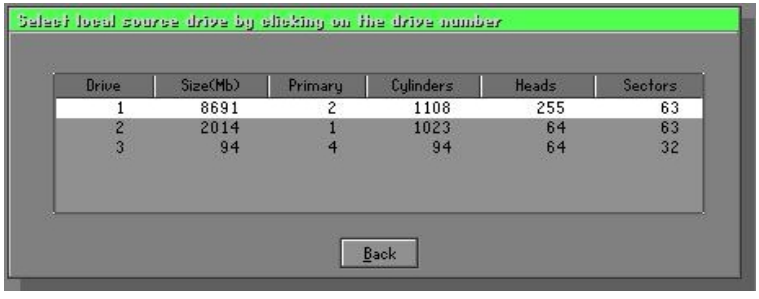
3. Click **OK** to display the following confirmation screen. Select **Yes** to start.

Disk From Image (Restore Backup)

1. Select the Restore file.

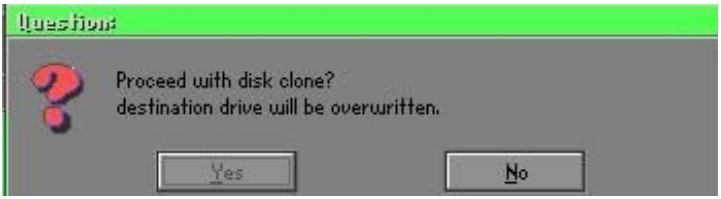


2. Select the **Destination drive** of the disk to be restored.

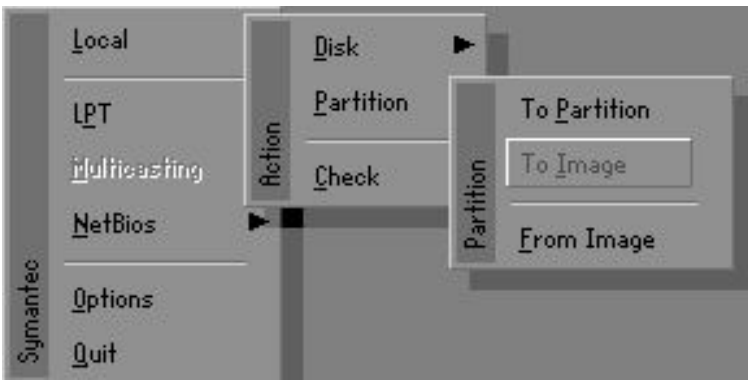


3. When restoring disk backup, set the required partition size as shown in the following figure.

4. Click **OK** to display the following confirmation screen. Select **Yes** to start.



Partition



There are 3 partition functions:

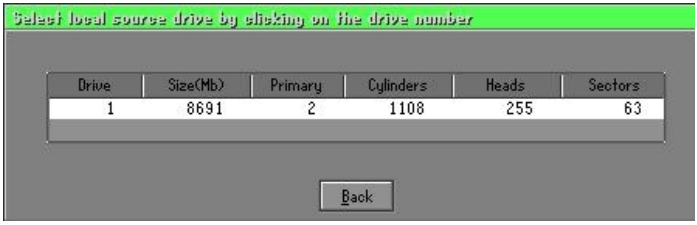
1. **Partition To Partition** (partition cloning)
2. **Partition To Image** (partition backup)
3. **Partition From Image** (restore partition)

Partition To Partition (Partition Cloning)

The basic unit for partition cloning is a partition. Refer to disk cloning for the operation method.

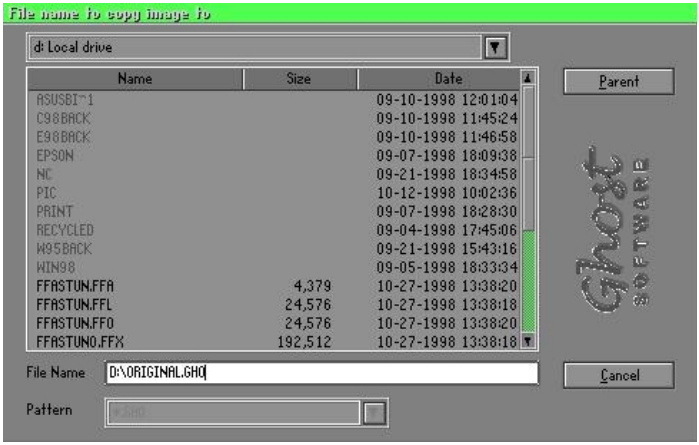
Partition To Image (Partition Backup)

1. Select the disk to be backed up.



2. Select the first partition to be backed up. This is usually where the operating system and programs are stored.

3. Select the path and file name for storing the backup file.

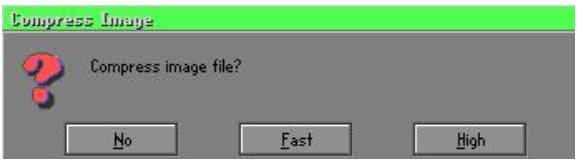


4. Is the file compressed? There are 3 options:

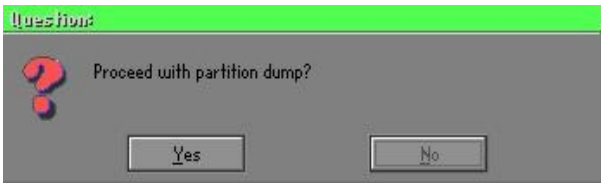
   (1) No: do not compress data during backup

   (2) Fast: Small volume compression

   (3) High: high ratio compression. File can be compressed to its minimum, but this requires longer execution time.

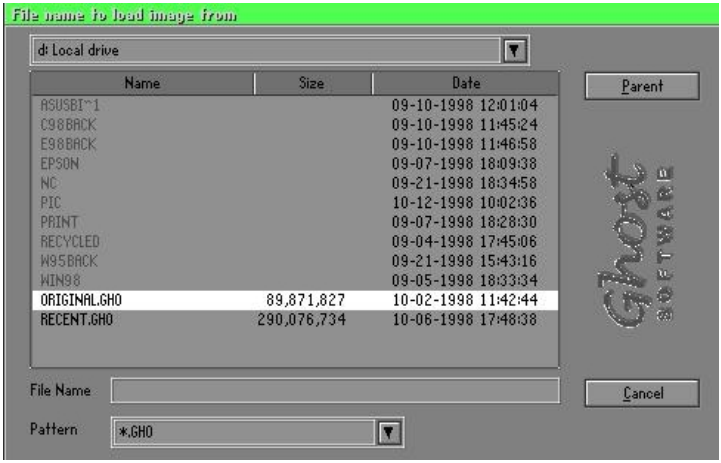


5. During confirmation, select Yes to start performing backup.



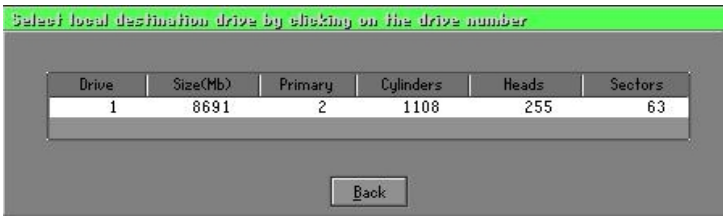
Partition From Image (Restore Partition)

1. Select the backup file to be restored.



2. Select the source partition.

3. Select the disk to be restored.



4. Select the partition to be restored.

5. Select Yes to start restoring.

Check

This function checks the hard disk or backup file for backup or restoration error due to FAT or track error.

How to Reinstall Windows in 2 Minutes

This chapter teaches you how to set your computer properly and, if necessary, reinstall Windows in 2 minutes. **Ghost** can use different methods to complete this task. The following two sections explain the creation of the emergency **Recover Floppy** and **Recover CD**:

Emergency Recover Floppy

Divide a hard disk into two partitions. The first partition is for storing the operating system and application programs. The second partition is for backing up the operating system and data. The size of the partition can be set according to the backup requirements. For example, the **Windows** operating system needs 200MB of hard disk space, while the complete **Office** installation requires 360MB. The remaining space can be used to store other data.

After installing **Windows,** use **Ghost** to create a backup of the source system and store the file (Image file) in drive D. The file is named as **Original.gho**. Then, create a recover floppy disk containing:

- Bootable files (Command.com, Io.sys, and MSDOS.SYS)
- Config.sys (configuration setup file)
- Autoexec.bat (auto-execution batch file)
- Ghost.exe (Ghost execution file)

There are two ways to set the content of the recover floppy for restoration:

(1) To load **Windows** automatically after booting, set the **Autoexec.bat** command as:

Ghost.exe clone, mode=pload, src=d:\original.gho:2,dst=1:1 -fx -sure -rb

Description: Runs the restore function automatically using the Image File. After execution, it exits Ghost and boots the system automatically.

Refer to the [Introducing Ghosts Functions].

(2) After booting, the screen displays the Menu. Select Backup or Restore: Since the user may install other applications in the future, he/she may design **Autoexec.bat** as a Menu to back up or restore the user-defined Image file as follows:

☞ **Backup**

Back up Windows and application programs as a file (Recent. gho). Command is:

Ghost –clone,mode=pdump,src=1:1,dst=d:\Recent.gho -fx -sure -rb

☞ **Restore**

Restore types include **[General Windows]** and **[Windows and Application Programs].** If you select **[General Windows],** the system is restored to the general **Windows** operation condition. The command is:

Ghost.exe -clone,mode=pload,src=d:\Original.gho,dst=1:1 -fx -sure -rb

If you select **[Windows and Application Programs],** the latest backup file (Recent.gho) is restored, skipping the installation and setup of application programs.

For description of relevant parameters, refer to **[Introducing Ghosts Functions]**.

For more information about menu design, refer to Config.sys and Autoexec.bat under /Menu in the CD. You can also create a backup CD containing Ghost.exe and these two files.

Recover CD

In recent years, well-known computer manufacturers (such as IBM, Acer, Compaq, etc.) bundle Recover CDs with their computers to reduce the cost resulting from servicing, while at the same time increasing their market competitiveness.

The following is a simple guide to how to create a recover CD:

1. For extremely easy creation of the recover floppy disk, use the copy program for example “Easy CD Creator “ (Note 2). First, create a recover floppy disk containing:

   Bootable files (Command.com and Io.sys and MSDOS.SYS)

   Config.sys (Configuration setup file)

   Autoexec.bat (Auto-execution batch file)

   Mscdex.exe (CD-Rom execution file)

   Ghost.exe (Ghost execution file)

   Oakcdrom.sys (ATAPI CD-ROM compatible driver)

   The content of Config.sys is:

   ```
   DEVICE=Oakcdrom.sys /d:idecd001
   ```

   The content of Autoexec.bat includes:

   ```
   MSCDEX.EXE /D:IDECD001 /L:Z
   Ghost.exe clone,mode=load,src=z:\original.gho,dst=1 -sure -rb
   ```

2. Write the backup image file (original.gho) of the entire hard disk or partition into the recover CD. Use the Recover CD to boot up the system and restore the backup files automatically.

For description of relevant parameters, refer to **[Introducing Ghosts Functions]**.

Note: For more details regarding the creation program and method for creating the recover CD, please refer to the legal software and relevant operation manual.

Ghost Command Line Switches Reference

Ghost may be run in interactive or in batch mode. Batch mode is useful for automating installations for backups using Ghost. Most of the Ghost switches are used to assist with batch mode operation. To list switches from Ghost, type ghost.exe -h.

-clone

The full syntax for this switch is:

clone,MODE={**copy**|**load**|**dump**|**pcopy**|**pload**|**pdump**},**SRC=**{drive|file|drive**:**partition|,**DST=**{drive|file|drive**:**partition},**SZE**{**F**|**L**|**n=**{nnnn**M**|nn**P**|**F**|**V**}}

Clone using arguments. This is the most useful of the batch switches and has a series of arguments that define:

a) MODE This defines the type of clone command to be used:

COPY	disk to disk copy
LOAD	file to disk load
DUMP	disk to file dump
PCOPY	partition to partition copy
PLOAD	file to partition load
PDUMP	partition to file dump

b) SRC This defines the source location for the operation:

Mode	**Meaning:**
COPY/ DUMP	Source drive (e.g, 1 for drive one)
LOAD	Disk image filename or device (e.g, g:\Images\system2.img)
PCOPY/ PDUMP	Source partition e.g, 1:2 indicates the second partition on drive one.
PLOAD	Partition image filename or device and partition number. Example: g:\images\disk1.img:2 indicates the second partition in the Image file.

c) DST This defines the destination location for the operation:

Mode	Meaning
COPY/ LOAD	Destination drive (e.g, 2 for drive two)
DUMP	Disk image filename or device,(e.g, g:\images\system2.img)
PCOPY/ PLOAD	Destination partition,(e.g, 2:2 indicates the second partition on drive two).
PDUMP	Partition image filename (e.g, g:\images\part1.img).

d) SZEy Used to set the size of the destination partitions for either a disk load or disk copy operation.

Available y Options:

F Resizes the first partition to maximum size allowed based on file system t type.

L Resizes the last partition to maximum size allowed based on file system type.

n=xxxxM - indicates that the n?h destination partition is to have a size of xxxx Mb. (e.g, SZE2=800M indicates partition two is to have 800 mb.) n=mmP - indicates that the n?h destination partition is to have a size of mm percent of the target disk.

n=F - indicates that the n?h destination partition is to remain fixed in size.

n=V - Indicates that the partition will be resized according to the following rules:

Rule 1 - If the destination disk is larger than the original source disk, then the partition(s) will be expanded to have the maximum amount of space subject to the free space available and the partition type (e.g, FAT16 partitions will have a maximum size of 2048Mb.)

Rule 2 - If the destination disk is smaller than the original source disk, (but still large enough to accommodate the data from the source disk), the free space left over after the

	data space has been satisfied will be distributed between the destination partitions in proportion to the data usage in the source partitions Someexamples follow that will help illustrate:
-fx	flag Exit. Normally when Ghost has finished copying a new system to a disk, it prompts the user to reboot with a press Ctrl-Alt-Del to reboot window. However, if Ghost is being run as part of a batch file it is sometimes useful to have it just exist back to the DOS prompt after completion so that further batch commands may be processed. -fx enables this. See -rb for another option on completing a clone.
-ia	Image All. The Image All switch forces Ghost to do a sector by sector copy of all partitions. When copying a partition from a disk to an image file or to another disk, Ghost examines the source partition and decides whether to copy just the files and directory structure, or to do an image (sector by sector) copy. If it understands the internal format of the partition it defaults to copying the files and directory structure. Generally this is the best option, but occasionally if a disk has been set up with special hidden security files that are in specific positions on the partition , the only way to reproduce them accurately on the target partition is via an image or sector-by-sector copy.
-span	enables spanning across volumes.
-split=x	splits image file into ‘x’ Mb? Mb spans. Use this to create a ‘forced’ size volume set. For example, if you would like to force smaller image files from a 1024 Megabyte drive, you could specify 200 megabyte segments.For example, ghost. exe -split=200 will divide the image into 200 Megabyte segments.
-sure	use the -sure switch in conjunction with -clone to avoid being prompted with the final ‘Proceed with disk clone destination drive will be overwritten?’ question. This command is useful in batch mode.

Example 1:
To copy drive one to drive two on a PC, without final prompt if OK to proceed.
ghost.exe -clone,mode=copy,src=1,dst=2 –sure

Example 2:
To connect via NetBIOS to another PC running Ghost in slave mode, and dump a disk image of local drive two to the remote file c:\drive2.gho
ghost.exe -clone,mode=dump,src=2,dst=C:\drive2.gho -nbm
Note: The slave Ghost can be started with ghost –nbs

Example 3:
To copy drive one, second partition on a PC to drive two, first parti-tion the same PC, without final prompt
ghost.exe -clone,mode=pcopy,src=1:2,dst=2:1 –sure

Example 4:
To dump the second partition of drive one to an image file on a mapped drive g:
ghost.exe -clone,mode=pdump,src=1:2,dst=g:\part2.gho

Example 5:
To load partition 2 from a two-partition image file on a mapped drive g: onto the second partition of the local disk
ghost -clone,mode=pload,src=g:\part2.gho:2,dst=1:2

Example 6:
To load drive 2 from an image file and resize the destination partitions into a 20:40 allocation
ghost.exe -clone,mode=load,src=g:\2prtdisk.gho,dst=2,sze1=60P, sze2=40P

Appendix E

E-1 POST CODES (Optional)

POST (hex)	DESCRIPTION
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: - Disable shadow RAM - Disable L2 cache (socket 7 or below) - Program basic chipset registers
C1h	Detect memory - Auto-detection of DRAM size, type and ECC. - Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
0B-0Dh	Reserved

0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19-1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.

	4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24-26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed. 5. Invoke video BIOS.
2A-2Ch	Reserved
2Dh	1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed ….
2E-32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34-3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h	Reserved
45-46h	Reserved
47h	Initialize EISA slot

48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program writes allocation for AMD K5 CPU.
4A-4Dh	Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53-54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH. EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onbaord_AUDIO switch.
5E-5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61-64h	Reserved
65h	Initialize PS/2 Mouse

66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware.
70-72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..
76h	Reserved
77h	Detect serial ports & parallel ports.
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor
7B-7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: ◆ Clear EPA or customization logo.
80h	Reserved
81h	Reserved
82h	1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full

	screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
86-92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	1. Program daylight saving 2. Update keyboard LED & typematic rate
96h	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table.
FFh	Boot attempt (INT 19h)